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GEOGRAPHICAL RECORD

AMERICAN GEOGRAPHICAL SOCIETY

Presentation of the David Livingstone Centenary Medal to Señor Ballivián. On July 6, at the American Legation at La Paz, the David Livingstone Centenary Medal of this Society, whose award for the third time since its foundation was announced in the July *Review,* was formally presented by the American Minister, the Hon. John D. O'Rear, to the distinguished Bolivian geographer, Señor Manuel Vicente Ballivián. Invitations were issued jointly in the name of the legation and of the Sociedad Geográfica de La Paz. There were present, in addition to the members of the Geographical Society of La Paz, the Minister for Foreign Affairs, members of the diplomatic corps, and many prominent citizens. In his presentation speech Mr. O'Rear outlined in a graceful and effective manner the long services of Señor Ballivián in promoting geographical research, in encouraging exploration, and in keeping alive the spirit of scientific inquiry both in government publications and in the Bulletin of the Geographical Society of La Paz.

In replying Señor Ballivián said in part:

''The award which you make is all the more precious to me, Mr. Minister, in that this medal not only commemorates the daring explorations of Livingstone among the lakes and about the sources of the Nile in Africa, but also brings to mind the noble efforts made by that distinguished traveler, who, at the same time that he was making geographical discoveries, employed every possible means to put an end to the horrors of human slavery.

''Your country, Mr. Minister, by not allowing the centenary of that intrepid and expert explorer to pass unobserved, has interrupted the sadness we feel as a result of the European War, and has spoken to us, in words of peace and wisdom, of achievements whose importance is world-wide and eternal'' (translation by this Society).

NORTH AMERICA

Merchant Adventurers of America. The ''merchant adventurer'' represents in our minds the spirit of English enterprise in Elizabethan times. The islanders who felt the inspiration of the sea became the creators of empire and of British wealth. Their contribution to geography was by no means slight. How this same sea-spirit was a living force in America about one hundred years ago is described by John Foord in an article entitled ''Pioneers in Foreign Trade'' in *Asia* for April, 1917. Many of the sailormen hailing from Old Salem and other parts of the Atlantic seaboard were descendants of members of the crews commanded by Drake and Frobisher; and they readily volunteered to man the privateers of the Revolution when a cordon of British cruisers, strung along the coast, was effectively blockading the republic. At first the incentive was prize money. Soon, however, the appeal of commercial ventures, combined with the development of manufacturing, made itself felt.

Great profits were to be made in those days in the trade of the Indies, East or West. Sometimes a vessel would be equipped for one of these two destinations only. More often both would be visited. In time, however, the Far Eastern trade became the most important. Starting with humble beginnings American traders soon succeeded in competing with the English. Many fortunes were made. It was customary to allow masters the privilege of carrying out their own ''adventures.'' Of this privilege their friends took advantage, and many a commission, each constituting an ''adventure,'' was entrusted to the sea-going captains. Mr. Foord cites a few instances such as that of Mr. John R. Tucker, a resident of Salem, who turned over one hundred Spanish dollars to Edward Stanley, master of the *Messenger*, with instructions to invest it at his discretion in foreign commodities. Mr. Tucker's ''adventure'' brought him $193.57, almost 100 per cent on the investment, according to Mr. Foord.

A complete study of these American ''adventures'' would add picturesque passages to the history of early national times. The period in which they were undertaken was one in which people took an interest in foreign affairs. Their ''adventures,'' whether modest or considerable, turned their thoughts to far-away places like Canton or Batavia. But the powerful attraction of a continental expanse of land to the west was to outweigh the influence of maritime enterprise. Now that the day of adjustment between these two attracting forces seems at hand, Mr. Foord's lines fit in as a most timely reminder.

The Nitrate Caves of the South. The U. S. Geological Survey is looking into every report of the occurrence of nitrate and potash, substances which during the war have become even more valuable than formerly. Supposedly rich discoveries have turned out in each case to be of doubtful importance, although some historically interesting information has gained circulation as a result of the Survey's studies. It has been found that a cave in one of the Southern States was worked by the Confederacy during the Civil War for potassium nitrate. The method of extraction was very crude. The cave earth was shoveled into iron pots, where it was treated with water and heated over wood fires to leach out its soluble parts. The liquor was drawn from one pot into another and used for treating fresh material until it became a highly concentrated solution of nitrate salts. It was then drawn off and allowed to cool, whereupon the nitrate crystallized. The remaining liquor was then employed to leach fresh material and the crystals were separated and sacked for use (*U. S. Geol. Survey Press Bull. No. 331,* August, 1917).

Agricultural Meteorology in the United States. A comprehensive summary of the present status of agricultural meteorology in the United States has been presented by Professor J. Warren Smith to the Ohio Academy of Science (*Proc. Ohio Acad. Sci.,* Vol. 6, Pt. 5, 1916, pp. 239-264). On account of the far-reaching effect of climate and weather on crop distribution and production, the scope of agricultural meteorology is wide. Unsuspected relations are found by comparing well-selected climatic maps with agricultural ones. For example, in Wisconsin, most of the cheese factories are where the mean summer temperature is below 70° F., while the creameries are in the regions warmer than 70° F. This distributional aspect is being studied in the preparation of the Atlas of American Agriculture by the Office of Farm Management with the collaboration of the other bureaus of the U. S. Department of Agriculture.

An investigation of the effect of weather on the growth of crops has not been undertaken in so comprehensive a manner. For corn, wheat, and potatoes, Professor Smith has already stated concisely some of the effects of weather on yields. Thus, with July rainfall 2 to 2½ inches, the average yield of the 30,000,000 acres of corn in Missouri, Iowa, Illinois, and Indiana is 23 bushels per acre; but with 2½ to 3 inches, the yield is 33. In other words, in this region, a half inch of July rainfall is worth ten bushels of corn per acre. The period immediately after blossoming, or August 1 to 10 in the middle of the corn belt, is the most critical in the growth of corn: relatively cool, moist weather at this time favors the highest yields. Potatoes in Ohio are affected by July weather more than by that of any other month: relatively cool, wet weather is best. At some other times, dry weather is favorable. For winter wheat, Professor Smith finds little correlation of Ohio yields with the weather of any month except March, when warmth or lack of snow are favorable, and coldness or more than usual snowfall unfavorable. It appears that better yields in Ohio generally follow Januarys with bare ground. The answers to questions raised by these results and to other unexplained weather effects, such as on crop limits, on the work of fertilizers, and on seed-vitality, are left to future study. And for this the foundations are now being laid by Professor Smith as head of the Weather Bureau's new division of agricultural meteorology.

CHARLES F. BROOKS.

The Commercial Prosperity of Porto Rico. The trade relations between the newly created Territory of Porto Rico and the United States have a special interest through their rapid progress, made of late years and particularly since the beginning of the war. One of the most striking aspects of this development is the growing importance of San Juan as a distributing market for the Caribbean, a position in which a naturally favorable location has been supplemented by the establishment of good steamship service with the ports of the Atlantic States. San Juan is only four or five days distant from New York. In 1916 imports into the island from the United States amounted to $41,591,944, a gain of 35 per cent on the figure for 1914. To this increase the demand from Santo Domingo contributed not a little, for the disturbed condition of this island prevented regular shipments direct from the United States. The second outstanding feature of Porto Rican trade development is the great expansion of the sugar industry. Two-thirds of the $68,246,319 representing the 1916 exports to the United States is accounted for by raw sugar, the export value of which more than doubled the figure for 1914. While the higher value is in part due to the increased selling price of sugar the output has also made headway, and it is encouraging to note that the 1917 crop promises to establish a new record (H. F. Kupfer: The New Territory of Porto Rico Unusually Prosperous, *Dun's Rev.: Internatl. Edit.,* July, 1917).

SOUTH AMERICA

Geographical Features of Potato Production in Bolivia. Many important trading towns on the plateaus of Peru and Bolivia have a weekly or annual "fair" for the sale and direct exchange of goods by barter. In such towns one of the most important places is the so-called "potato plaza," where sacks and heaps of potatoes are scattered about. To the stranger the number of varieties of potatoes is truly remarkable, but easily understood when he recalls that the Andean plateau is the ancestral home of the potato. Even in some lofty localities there may be found dozens of wild and inedible varieties. In the Bolivian and Peruvian tablelands and high mountain valleys the potato forms the chief and, in many places, almost the only vegetable food of the highland farmers and shepherds.

There has recently appeared a very instructive report on the Bolivian potato by the President of the Geographical Society of La Paz and recently the recipient of the David Livingstone Centenary Medal of this Society—Señor Manuel Vicente Ballivián (M. V. Ballivián and W. C. Tovar: Noticia histórica y clasificación de la papa de Bolivia, 22 pp., La Paz, 1914). The paper opens with an historical and descriptive account of the cultivation, manner of growth, habitat, uses, and varieties of the potato. In the section on classification it is interesting to note that 184 distinct varieties are listed. The name of each variety is given, the Spanish equivalent, and a brief description of its chief characteristics. There are three colored plates. The descriptive part of the paper gives some highly interesting accounts of the mode of preparation of the chief varieties now used. Perhaps the most striking item relates to the preparation of *chuño* for the caciques and other dignitaries. After being dried in the sun and wind and frozen on the bare ground at night the potatoes are soaked in water for two months, then dried again in the sun, and at last become very white. In relation to this custom one may see a curious sight on the Desaguadero River in western Bolivia. Here and there is a sack of potatoes lying in the shallow water near the bank and tied with a grass rope to a stake driven into the earth. Directly the whistle of the river steamer blows a boy may be seen running at full speed down to the water's edge and hauling on the rope, to see if the wash of the lumbering stern-wheeler has broken loose his submerged sack of potatoes.

The Influence of Weather on Argentine Agriculture. From the economic standpoint Argentina is primarily interesting as a producer of foodstuffs for export. In 1913 over two-thirds of the value of her exports was accounted for by wheat and maize. Argentina is the leading world exporter of the latter and in export of wheat ranks with Russia and the United States. But here as elsewhere the generally speculative nature of agricultural industry makes itself strongly felt: the crop variations are great. The year 1907-08 is remembered for the record wheat harvest, with a production of over 5,250,000 tons and an export of over 3,500,000. In the year 1913-14, with a much greater area under cultivation, the production was little more than 3,000,000 tons, with under 1,000,000 available for export. Fluctations in the corn crop are even more marked. In 1909-10 the harvest amounted to 4,500,000 tons; in the succeeding year to less than 750,000 and in 1914-15 reached the record figure of 8,500,000.

While the locust plague is apprehended as a more or less important agency of destruction, the chief element of variability lies in the climatic irregularities, especially in the recurring periods of drought. The vital importance of the weather in Argentina, felt through its effect on the cereal crops, is well illustrated in the consternation lately caused by the embargo placed on wheat export. The study of Argentine weather, then, assumes a character of practical importance. In advancement of such a study the inauguration of a monthly bulletin by the National Meteorological Office is therefore most welcome (see note in the July *Review,* p. 60). The need of such a report as a complement to the daily weather charts has long been felt, but heretofore funds for the purpose have not been available.

The New Boundary between the Brazilian States of Santa Catharina and Paraná. The long boundary controversy between the states of Santa Catharina and Paraná was settled by an agreement ratified on October 20, 1916, at Rio de Janeiro. Through the courtesy of the National City Bank of New York, the Society is enabled to present the following notice of the revision, the full text of which appeared in São Paulo papers on October 21, 1916. Starting on the Atlantic coast the new line will coincide with the boundary agreed to since 1771 and will follow the course of the Rio Negro to its confluence with the Rio Iguassú. It will there cross the bridge of the São Paulo-Rio Grande Railway and coincide with the tracks of this road as far as the junction with the branch connecting Porto União de Victoria and Palmas. Thence the line will follow this railway until the Rio de Jangada is attained. From this point the boundary follows the river to its source. Thence it proceeds in a straight line perpendicular to the meridians until it reaches the water-divide. It then strikes west towards the line which connects the sources of the San Antonio and Peperiguassú Rivers. Beyond, it is prolonged to the Argentine frontier.

Through this settlement part of northwestern Santa Catharina is added to the state of Paraná.

EUROPE

The British Canal System. The reconstruction of the New York State waterways, the recent opening of the Marseilles-Rhone canal, the proposed connections between the Danube and the Rhine, Oder and Elbe and other extensive canalization projects contemplated by the Central Powers are evidences of the general revival of interest in transportation by inland waterways (*Commerce Repts.*, 1917, Nos. 69 and 86, 1917; see also the note on the Main-Danube Canal in the *Scott. Geogr. Mag.* for April, 1917). On the Continent, indeed, the revival is not new. In Germany it began in the seventies. In two decades the waterborne traffic of the interior had increased 120 per cent. Like progress was made in Belgium and northern France. The former country in particular owes its great industrial growth to the development of its waterways. Across the North Sea conditions have been different. The British inland waterways have declined progressively from the days of the canal era that began with the industrial revolution and contributed so much towards it (compare B. C. Wallis: Central England during the Nineteenth Century, *Geogr. Rev.*, January, 1917). Since the advent of the railroad in the second quarter of the nineteenth century no new canals have been constructed, except the Manchester Ship Canal, which pertains to a different class. Improvements also have been few, and traffic on the major part of the 4,670 miles of canal and canalized river now existing is negligible. A few years ago the government, aroused by the contrasting conditions on the Continent, appointed the Royal Commission on Canals and Waterways. Its findings, published in 1909, showed, however, that negligence was in part due to physical difficulties. As compared with Continental conditions, at least in the plain of Belgium and northern Germany, engineering obstacles are great. The number of locks on the British canals testify to this. In fact some of the early canals, as those across the Pennines, show engineering feats of no mean order. Moreover the present condition of the waterways is adverse to the employment of mechanical traction, an improvement that has done much to increase the usefulness of the Continental waterways, and another limiting factor is the inadequate or irregular water supply that proves serious in some of the Midland systems, notably the Trent.

Today the stimulation given to waterborne traffic by the congestion on the railways renews the problem of their improvement. That a better utilization may well be effected under the present governmental control is the opinion expressed in the *Engineering Supplement of the London Times* (issue of February 23, 1917, with waterway map of Great Britain, 1:1,900,000, showing (1) canals and navigable rivers, (2) derelict canals, and (3) canals converted into, or sites used for railroads), which instances the successful operation of such canals as the Aire-Calder, the important system connecting the Yorkshire woolen towns with the Humber. In a later issue of the *Engineering Supplement* (April 27, 1917) the engineering problems are considered in an optimistic light.

The Severe Winter of 1917 in Scandinavia. Charles Rabot, in discussing the winter of 1917 in Scandinavia (L'hiver 1917 dans la Scandinavie, *La Nature*, April 21, 1917), points to the way in which extraordinary ice conditions hampered the Germans. For about two months, railway ferriage between Sweden and Denmark was frequently obstructed; and for two weeks early in February it stopped entirely. Other ships were caught in the ice or had to set back. In fact, one captain reported that there were two hundred ships stuck in the Skager Rak early in February; and Danish fishermen said that 33 German submarines were blocked in the ice of the Kattegat on February 7. Moving ice exploded many mines. This ice condition, which was the most severe since 1895, was the result of an extraordinary period of cold weather in southern Scandinavia, northern France and Germany lasting from late December till the middle of March. At Christiania, the temperature from December 23 to February 9 did not rise above freezing—a duration unique in the 56 years of observations. January, with a mean of –10.9° C., was 6.9° C. below normal—the coldest on record, although the absolute minima were not extraordinary. In Sweden, however, a temperature of –55° C. was observed at Vucnatjviken, a meteorological station at an altitude of 500 meters in Norrbotten, northern Sweden. There were some extraordinary snowstorms: one near Christiania on February 2-3 caused a disastrous avalanche. Another over all Norway ten days later was so severe in Vardö that a woman was lost in the middle of the village; and houses were practically snowed in. On March 14 northern Denmark suffered the worst snowstorm in forty-five years, one which suspended railroad traffic in north Jutland.

The undersigned may suggest the following by way of explanation. In the seven weeks from February 9 to March 28, 1916, the temperature of the surface water passing through the Florida Straits averaged 23° C.—about 0.5° C. below normal. In the course of ten to eleven months some of this water arrived in the Norwegian Sea; and, being cooler than usual, weakened the Iceland cyclone. This allowed a westward extension of the Eurasian anticyclone with its attendant cold weather. CHARLES F. BROOKS.

ASIA

Recent Developments of the Bagdad Railway. A history of the negotiations leading to the construction of the Bagdad railway, together with an account of the state of construction, is given by H. Charles Woods in a recent article (The Baghdad Railway and Its Tributaries, *Geogr. Journ.*, July, 1917). The report of the completion of the tunnels in the mountainous sections connecting Anatolia with Syria is now confirmed. Through connection between Constantinople and Aleppo is therefore possible—a fact which is of interest because it adds greatly to the strength of the Turco-German position in Turkey.

Regarding the future of the line Mr. Woods justly assumes that the subject is one which is hard to forecast at the present time. The only certainty lies in the fact that the line will benefit the development of Asiatic Turkey's resources. The details of its operation depend entirely upon the international situation at the advent of peace. The question of internationalizing the line is one which will then come up for discussion. By its geographical position Turkey is a land in which internal problems are magnified to the point of assuming international importance. Mr. Woods gives numerical evidence of this fact by recalling that before the war mails conveyed from London to Bombay by the usual sea route required thirteen or fourteen days, whereas with the completion of the Bagdad line the time of transit will be reduced to between nine and ten days.

Additional Notes on the Population Density of Japan. In abstracting a short article by the writer in the November, 1916, *Review* on "The Distribution of People in Japan in 1913," the *Annales de Géographie* (March 15, 1917, pp. 151-152), in their usual admirable manner, present additional facts of interest, which it is desired herewith to credit to their proper source, as the abstract itself modestly gives no hint as to their authorship.

Although the high population density of the majority of the prefectures in the most densely populated zone of Japan is generally due to the presence of urban centers, the prefecture of Takamatsu, on the island of Shikoku, has 425 inhabitants to the square kilometer without the help of any important city. This is in the southern belt of dense population, which coincides with the so-called "median line" in the physical structure of the islands "determined by the work of Harada, Koto, Naumann, and formed of a chain of tectonic valleys and zones of sinking, interrupted here and there by gulfs, recent sediments and volcanic deposits. This line, according to Harada, marks structurally the limit between the outer coast of Japan, which is regularly folded and poor in volcanic rocks, and the coast inside, along the Sea of Japan, which abounds in *graben* and eruptive phenomena and forms a region of faulted arches." The great density of population of the empire in spite of its generally rugged surface is only rendered possible by the cultivation of rice, and Yezo was so long neglected by the Japanese as to seem still uninhabited among the dense populations of the empire because it was unsuited to grow rice. MARK JEFFERSON.

POLAR REGIONS

Safe Return of the Members of the Crocker Land Expedition, and Resurvey of the Southeastern Coast of Ellesmere Island. On August 26 the relief ship *Neptune*, whose departure was announced in the July *Review* (p. 62), reached Sydney, Cape Breton, with the members of the Crocker Land Expedition. All were in good health and have since reached their final destination in the United States, MacMillan and Hovey arriving in New York some time ago. The trip from Etah took twenty-two days. Southerly winds had packed Smith Sound and Melville Bay with drift ice, and the ship was leaking badly on its arrival as a result of the constant hammering of the ice.

In the same telegram in which MacMillan announced the safe return of the party (published in the daily press of August 28) he described a trip made last spring along the southeastern coast of Ellesmere Island. The section covered extends from Cape

Sabine (78¾° N.) to Clarence Head (76⅔° N.). This stretch of coast was surveyed roughly by Inglefield in 1852 (Correspondence Relating to Arctic Expeditions, 88 pp., *British Blue Book No. 82,* ordered to be printed December 20, 1852; reference on pp. 35-39 and map facing p 40), Kane in 1854 (E. K. Kane: Arctic Explorations: The Second Grinnell Expedition, etc., 2 vols., 1856, map facing p. 8 in Vol. 2), and, more accurately, by Hayes in 1861 (I. I. Hayes: Physical Observations in the Arctic Seas, with map, 1:1,200,000, *Smithsonian Contr. to Knowledge 196,* in Vol. 15, 1867). But all these delineations were based on surveys made from the decks of vessels, often by means of distant sights, as ice prevented a close approach to shore. They are thus naturally not always accurate as to details. MacMillan's sledge trip has corrected a number of these inaccuracies.

Starting from Etah (on the Greenland coast, 78⅓° N.) on March 26, 1917, with three Eskimos, Smith Sound was crossed in four days. On the opposite shore open water forced the party to go south by way of Rice Strait, an interior channel separating Pim Island from the main body of Ellesmere Island. Blocked at Cape Herschel, a little farther south, MacMillan turned inland again and cut across the intervening promontory to Baird Inlet (78½° N.). Here, at Eskimo Point, at the northern entrance to the inlet, the walls of three stone houses and the remains of a boat were found on the site of the first encampment of Greely's starving party in 1883. Continuing south, MacMillan was completely stopped at Cape Isabella (78⅓° N.) by open water and an impassable ice-foot. Before turning back he searched the cape carefully and was fortunate in finding records left by Sir George Nares of the British expedition of 1876, also mail for H. M. S. *Discovery* and *Alert,* left by Sir Allan Young of the *Pandora.* They were legible and in fairly good condition. On the return to Etah, Baird Inlet was mapped.

Starting again from Etah on May 3, ice conditions were found unchanged. An inland route was therefore chosen leading across Cadogan Inlet to Paget Point (78° 10′ N.). South of this point there was sea ice and traveling was easier. MacMillan notes various new features between here and Clarence Head. Between Paget Point and Cape Faraday (77° 40′ N.) a very large glacier was discovered and named the American Museum Glacier. It is formed by the ice cap pushing over the edge of the land into the sea and is only second in size to its analogue, Humboldt Glacier on the coast of Greenland between 79° and 80° N.

The other discoveries reported relate to the existence of two islands, one south of Paget Point, the other in Talbot Inlet, just south of Cape Faraday, and the non-existence of Sonders Island (77° 10′ N.). Throughout this region glacial activity has increased since the middle of the nineteenth century. The land is fairly buried in ice, which flows over and around the headlands and fills all the fiords.

On his return MacMillan camped in Peary's old hut at Cape Sabine and visited the second camp of Greely's starving party on the north shore of the cape and made a survey and took photographs of the locality. Throughout this sledge journey good sights for longitude, latitude, and azimuth were obtained at all salient points.

HUMAN GEOGRAPHY

The Cause of Pellagra, Disease of Mountain Countries. In 1906 public interest became aroused in a mysterious scourge that had long been known in Europe and that appeared to have been transplanted to America. By 1911 the epidemic had affected 30,000 people in an area including all but nine states in the Union, according to a paper by Benjamin Brooks (*Illustrated World,* January, 1916, pp. 642-646). The paper cited is accompanied by a map showing the distribution of the disease in America, and it is pointed out that there is a striking relationship between such distribution and the distribution of the older and more deeply eroded mountain ranges and the drainage basins of rivers originating in these mountains. The application of the words "new" and "old" are, however, unfortunately made, and some other factor than age is responsible for the distribution of the disease. The map in question cannot be commended in any scientific study of the disease. (For a similar map, of scientific worth, see map showing the relation of goiter in Europe to the underlying geological formation, in Berghaus' Physikalischer Atlas, 1892, Pl. 64.)

Experiments made on victims of the disease seem to show that it is caused by the colloidal silica in the food, and a cure has been found in sodium citrate. It is suggested that waterworks engineers introduce the proper alkali into the water systems of large towns. The prevention of pellagra has become more difficult in country localities, but broken limestone in the bottom of a cistern and the exclusion of surface drainage from ordinary wells are suggested as remedial measures. The interesting comment is made that in France, where the same land is plowed each year and where cultivations extends back over a much longer period, pellagra, once widely prevalent, is now disappearing.